Illinois Department of Transportation

To:	Roger Driskell	Attn: District Six
From:	John D. Baranzelli	
Subject:	Pavement Design	
Date:	July 16, 2013	

FAP 745 (IL Route 104)
Section 109RS-6, 123RS-3, 123B-2, 124RS-8
Pike and Morgan Counties
From IL 99 to Yeck Road

We have reviewed the pavement design for the above captioned section, which was originally submitted to BDE on March 21, 2013. A revised memo was submitted on July 2, 2013 to reflect modifications in the proposed subgrade. The project will reconstruct the Illinois River Bridge at Meredosia and realign IL 104. The pavement design favored the HMA Pavement by 2%. The Pavement Selection Committee met on June 17, 2013 to discuss this project. The district requested that the segment between the two structures be built with a rigid pavement design. The rest of the pavement will be full depth HMA. The new profile for the river bridge requires substantial fill, and traffic staging through Meredosia will be an issue. Based on these reasons, the committee concurred with the HMA pavement design outside the structures.

The approved pavement design is as follows:

IL 104 between structures [New Construction]

9 inches of PCC pavement with PCC Shoulders
8 inches of Subgrade Granular Material, Type A

IL 104 outside the structures [New Construction]

10.75 inches of Full-Depth HMA Pavement with HMA Shoulders
- 2 inches of HMA Polymerized Surface Course, Mix "C", N70
- 2.25 inches of HMA Polymerized Binder Course, IL-19.0, N70
- 6.5 inches of HMA Binder Course, IL-19.0, N70

8 inches of Subgrade Granular Material, Type A

Local Street Design

9 inches of Full Depth HMA
8 inches of Subgrade Granular Material, Type A

If you have any questions, please contact Paul Niedernhofer at (217) 524-1651.

06-17-13 Pavement Selection Committee

D-4 NW Quadrant Macomb Bypass

The primary request from D-4 was to use HMA to match the adjacent sections. The previously approved NW Quadrant Macomb Bypass was discussed by the committee. BDE had approved the pavement design as HMA, but this did not follow the pavement design procedure found in the BDE Manual. The criteria for alternate bidding has been met for this project. This project will be designed as an alternate bid contract.

The short segment of IL 336 will be let as a part of this contract and will also be designed as alternate bid.

D-1 IL 47 at Main Street

This project favored the rigid design over the flexible design, but was less than 10%. The BDE Manual requires projects within 10% of each design to be discussed by the Pavement Selection Committee for approval of the pavement type.

The Pavement Selection Committee concurred with the rigid pavement design.

D-6 IL 104 from IL 99 to Yeck Road

The pavement design favored the flexible design by 2%. The district requested that the segment [165 feet in length] between the two new bridge structures be built with the rigid design. This stage of the project will be on new alignment. The rest of the overall project will be designed as HMA. Based on the district's soils report, the aggregate subgrade improvement will be reduced from the standard 12" to 8".

The Pavement Selection Committee concurred with the district's design procedure.

Illinois Department of Transportation

Memorandum

To:	John Baranzelli	Attn: Paul Niedernhofer
From:	Roger Driskell	By: Laura Mlacnik LRM 4/1/13
Subject:	Pavement Design	
Date:	March 21, 2013	

FAP 745 (IL 104)
Contract 72B58
D-96-016-08
Section 109RS-6, 123RS-3, 123B-2, 124RS-8
Pike and Morgan Counties
IL 99 to Yeck Road 0.3 Miles E of Meredosia (with bridge replacement)

Attached for your review is the pavement design for the above-referenced section. This section consists of construction of a new bridge over the Illinois river and related construction on IL 104 and connecting roadways. IL 104 is to be realigned and reconstructed for approximately 4,500 ft. Several options were considered with the results as follows:

Full-Depth HMA,	10 ¾ inches (Mechanistic)
JPCP	9 inches (Mechanistic)

The district recommends that 9 in. Jointed Plain Concrete Pavement with 4 in. Stabilized Subbase be utilized for the IL 104 pavement between the structures for the following reasons:

1. Pavement section is only about 165 ft. in length between the bridge approach pavements with a total pavement area of 835 sq. yds. including shoulder.

2. This section of pavement will be constructed during the second construction season along with completion of both structures. The

For the remaining IL 104 pavement, the district recommends that 10 ¾ in. Full-Depth HMA Pavement be utilized for the following reasons:

1. A life-cycle cost analysis was completed which showed HMA pavement as approximately 2% cheaper than JPCP.

2. HMA pavement would allow for easier staging at the ends of the project and through the Village of Meredosia.

3. The profile for the new river bridge requires substantial fill on each side of the river, and settlement is expected in these areas. Due to the expected settlement, the District 6 Materials Engineer recommends that HMA pavement be used.

For the improved subgrade west of the Illinois River, the district proposes to use 12 in. of Modified Soil. East of the river, the district requests to use an improved subgrade consisting of 8 in. Subbase Granular Material, Type A. District 6 typically specifies 8 in. of Subbase Granular Material, Type A in improved subgrade applications where the underlying soils show an IBV of 3 or better. Research conducted by District 6 (Physical Research Report #154) and the Illinois Center for Transportation (ICT R27-1 & R27-81), combined with approximately 10 years of field experience, indicates an 8 in. layer of Subbase Granular Material, Type A performs as well as a 12 in. layer when the underlying soil IBV is 3 or better. The physical properties of the aggregates typically used in District 6 allow this reduction in thickness with no loss in performance. When the IBV is less than 3 at the time of construction, the appropriate remedial action is determined according to the Department's Subgrade Stability Manual.

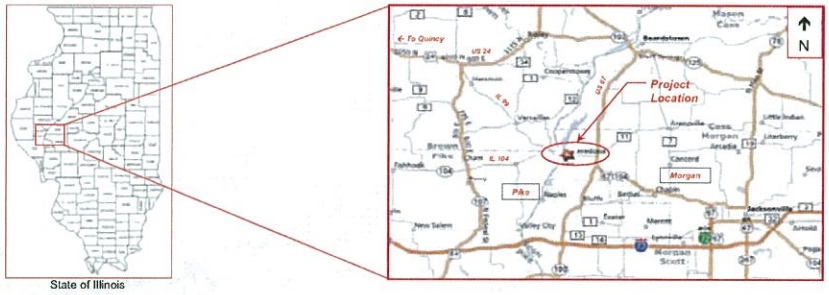
For the local roads in Meredosia, the district proposes to use the following pavement design:

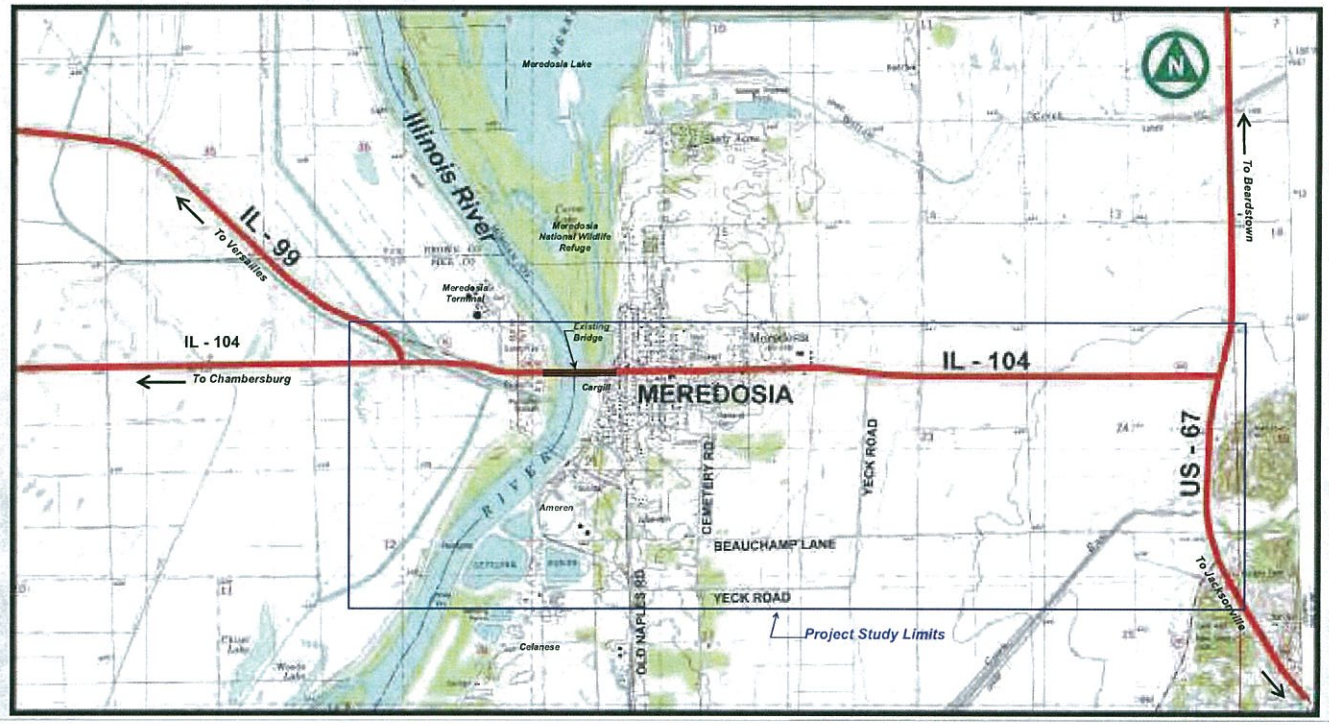
Full-Depth HMA, 9 inches
Subbase Granular Material, Type A, 8 inches

If you have any questions or require additional information, please contact Jay Edwards at 785-5321.

Enclosure

Project Location / Study Limits





IL-104 over Illinois River, Meredosia, IL
6/15/2010

EXHIBIT 1

BDE 5401 Template (Rev. 10/05/2012)

IDOT MECHANISTIC PAVEMENT DESIGN

Printed: 11/05/2013

PROJECT AND TRAFFIC INPUTS

(Enter Data in Gray Shaded Cells)

Route: FAP 745 (IL 104)
Section: 109RS-6, 123RS-3, 123B-2, 124RS-8
County: Pike/Morgan
Location: Meredosia

Comments: New bridge approaches and connecting roads

Design Date: 10/11/2012 JDE <-- BY
Modify Date: <-- BY

	ADT	Year
Current:	2,500	2012
Future:	3,260	2027

Facility Type: Other Marked State Route
# of Lanes = 2 or 3
Part of future 4 lanes or more ? No
One Way Street ? No
Road Class: II

Subgrade Support Rating (SSR): Poor
Construction Year: 2017
Design Period (DP) = 20 years

	Structural Design Traffic			
	Minimum ADT	Actual ADT	Actual %of Total ADT	% of ADT in Design Lane
PV =	0	2,786	85.5%	P = 50%
SU =	250	83	2.6%	S = 50%
MU =	750	391	12.0%	M = 50%
Struct. Design ADT =		3,260	(2027)	

TRAFFIC FACTOR CALCULATION

FLEXIBLE PAVEMENT			RIGID PAVEMENT		
Cpv =	0.15		Cpv =	0.15	
Csu =	112.06		Csu =	135.78	
Cmu =	385.44		Cmu =	567.21	
TF flexible (Actual) =	1.61	(Actual ADT)	TF rigid (Actual) =	2.34	(Actual ADT)
TF flexible (Min) =	3.17	(Min ADT Fig. 54-2.C)	TF rigid (Min) =	4.59	(Min ADT Fig. 54-2.C)

NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

Full-Depth HMA Pavement

Use TF flexible = 3.17
PG Grade Lower Binder Lifts = PG 64-22 (Fig. 53-4.R)
Goto Map
HMA Mixture Temp. = 78.0 deg. F (Fig. 54-5.C)
Design HMA Mixture Modulus (E_{HMA}) = 610 ksi (Fig. 54-5.D)
Design HMA Strain (ε_{HMA}) = 86 (Fig. 54-5.E)
Goto Map
Full Depth HMA Design Thickness = 10.75 in. (Fig. 54-5.F)
Limiting Strain Criterion Thickness = 15.75 in. (Fig. 54-5.I)

Use Full-Depth HMA Thickness = 10.75 inches

JPC Pavement

Use TF rigid = 4.59
Edge Support = Tied Shoulder or C.&G.

Rigid Pavt Thick. = 9.00 in. (Fig. 54-4.E)

CRC Pavement

Use TF rigid = 4.59
IBR value =

CRCP Thickness = 999.00 in. (Fig. 54-4.N)

TF MUST BE > 60 FOR CRCP

RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

HMA Overlay of Rubblized PCC

Use TF flexible = 3.17
District =

HMA Overlay Design Thickness = 999.00 in. (Fig. 54-5.U)

Unbonded Concrete Overlay

Review 54-4.03 for limitations and special considerations.

JPCP Thickness = NA inches

CONTACT BMPR FOR ASSISTANCE

DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

Class I Roads	Class II Roads	Class III Roads	Class IV Roads
4 lanes or more Part of a future 4 lanes or more One-way Streets with ADT > 3500	2 lanes with ADT > 2000 One way Street with ADT <= 3500	2 Lanes (ADT 750 -2000)	2 Lanes (ADT < 750)

	Min. Str. Design Traffic (Fig 54-2.C)		
Facility Type	PV	SU	MU
Interstate or Supplemental Freeway	0	500	1500
Other Marked State Route	0	250	750
Unmarked State Route	No Min	No Min	No Min

Class Table for One-Way Streets	
ADT	Class
0 - 3500	II
>3501	I

	Traffic Factor ESAL Coefficients			
	Rigid (Fig. 54-4.C)		Flexible (Fig. 54-5.B)	
Class	Csu	Cmu	Csu	Cmu
I	143.81	696.42	132.50	482.53
II	135.78	567.21	112.06	385.44
III	129.58	562.47	109.14	384.35
IV	129.58	562.47	109.14	384.35

Class Table for 2 or 3 lanes (not future 4 lane & not one-way street)	
ADT	Class
0 - 749	IV
750 - 2000	III
>2000	II

	Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2.B)					
	Rural			Urban		
Number of Lanes	P	S	M	P	S	M
1 Lane Ramp	100%	100%	100%	100%	100%	100%
2 or 3	50%	50%	50%	50%	50%	50%
4	32%	45%	45%	32%	45%	45%
6 or more	20%	40%	40%	8%	37%	37%

BDE 5401 Template (Rev. 10/05/2012) Printed: 11/05/2013

LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

Standard Design

ROUTE	FAP 745 (IL 104)
SECTION	109RS-6, 123RS-3, 123B-2, 124RS-8
COUNTY	Pike/Morgan
LOCATION	Meredosia, Segments A, B, C

FACILITY TYPE: NON-INTERSTATE

PROJECT LENGTH			4500	FT = = >	0.85 Miles
# OF CENTERLINES			1	CL	
# OF LANES			3	LANES	
# OF EDGES			2	EP	
LANE WIDTH - AVERAGE			12	FT	
SHOULDER WIDTH	HMA	Inside	8	FT	
	HMA	Outside	8	FT	

PAVEMENT THICKNESS (FLEXIBLE)	10.75 IN	15.75 IN MAX	
SHOULDER THICKNESS	8.00 IN		Standard Design
POLICY OVERLAY THICKNESS	2.25 IN		

FLEX PAVEMENT TRAFFIC FACTORS	MINIMUM	ACTUAL	USE
	3.17	1.61	3.17

Read Me!

HMA COST PER TON	UNIT PRICE
HMA SURFACE	$100.00 / TON
HMA TOP BINDER	$90.00 / TON
HMA LOWER BINDER	$80.00 / TON
HMA BINDER (LEVELING)	$90.00 / TON
HMA SHOULDER	$85.00 / TON

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST	
HMA PAVEMENT (FULL-DEPTH)	(10.75")	15,083	SQ YD	*	$52.89	/ SQ YD	$797,695	~
HMA SURFACE COURSE	(2.00")	1,702	TONS	*	$100.00	/ TON	$0	
HMA TOP BINDER COURSE	(2.25")	1,948	TONS	*	$90.00	/ TON	$0	
HMA LOWER BINDER COURSE	(6.50")	6,393	TONS	*	$80.00	/ TON	$0	
HMA SHOULDER	(8.00")	5,238	TONS	*	$85.00	/ TON	$445,230	~
CURB & GUTTER		0	LIN FT			/ LIN FT	$0	
SUBBASE GRAN MATL TY C (TONS)		1,284	TONS	*	$32.00	/ TON	$41,088	
IMPROVED SUBGRADE:	Aggregate	15,139	SQ YD	*	$12.75	/ SQ YD	$193,022	
MODIFIED SOIL (WEST)		13,761	SQ YD	*	$2.50	/ SQ YD	$34,403	
LIME		310	TONS	*	$75.00	/ TONS	$23,222	
PAVEMENT REMOVAL		0	SQ YD	*		/ SQ YD	$0	
SHOULDER REMOVAL		0	SQ YD	*		/ SQ YD	$0	

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST	$1,534,660
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE	$73,441

MAINTENANCE COSTS:

ITEM		THICKNESS	MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY					$0.00	LANE-MILE / YEAR
HMA OVERLAY PVMT SURF		(2.00")	Surface Mix		$11.25	/ SQ YD
HMA OVERLAY PVMT		(2.25")			$12.24	/ SQ YD
HMA SURFACE MIX		(1.50")	Surface Mix		$8.43	/ SQ YD
HMA BINDER MIX		(0.75")	eling Binder Mix		$3.81	/ SQ YD
HMA OVERLAY SHLD	(Year 30)	(2.25")	Shoulder Mix		$10.71	/ SQ YD
HMA OVERLAY SHLD		(2.00")	Shoulder Mix		$9.52	/ SQ YD
MILLING (2.00 IN)					$2.75	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill Surf)	Surface Mix		$80.95	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill Surf)	Shoulder Mix		$79.27	/ SQ YD
PARTIAL DEPTH PVMT PATCH		(Mill & Fill +2.00 ")	Leveling Binder Mix		$79.83	/ SQ YD
PARTIAL DEPTH SHLD PATCH		(Mill & Fill +2.00 ")	Shoulder Mix		$79.27	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL					$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL					$2.00	/ LIN FT
RANDOM / THERMAL CRACK ROUT & SEAL		(100% Rehab = 110.00' / Station / Lane)			$2.00	/ LIN FT

FLEXIBLE TOTAL LIFE-CYCLE COST	$2,091,314
FLEXIBLE TOTAL ANNUAL COST PER MILE	$100,079

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 11/05/13

FULL-DEPTH HMA PAVEMENT
HMA OVERLAY OF RUBBLIZED PCC PAVEMENT
Figure 54-7.C
STANDARD DESIGN

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 5								
	LONG SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CNTR LINE JOINT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RNDM / THRM CRACK R&S	50.00%	7,425	LIN FT	$2.00		$14,850	
	PD PVMT PATCH M&F SURF	0.10%	15	SQ YD	$80.95		$1,214	
	PWFn =	0.8626		PW =	0.8626	X	$43,064	$37,147
YEAR 10								
	LONG SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CNTR LINE JOINT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RNDM / THRM CRACK R&S	50.00%	7,425	LIN FT	$2.00		$14,850	
	PD PVMT PATCH M&F SURF	0.50%	75	SQ YD	$80.95		$6,071	
	PWFn =	0.7441		PW =	0.7441	X	$47,921	$35,658
YEAR 15								
	MILL PVMT & SHLD 2.00"	100.00%	26,775	SQ YD	$2.75		$73,631	
	PD PVMT PATCH M&F ADD'L 2.00"	1.00%	151	SQ YD	$79.83		$12,054	
	HMA OVERLAY PVMT 2.00"	100.00%	15,083	SQ YD	$11.25		$169,712	
	HMA OVERLAY SHLD 2.00 "	100.00%	11,692	SQ YD	$9.52		$111,308	
	PWFn =	0.6419		PW =	0.6419	X	$366,705	$235,374
YEAR 20								
	LONG SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CNTR LINE JOINT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RNDM / THRM CRACK R&S	50.00%	7,425	LIN FT	$2.00		$14,850	
	PD PVMT PATCH M&F SURF	0.10%	15	SQ YD	$80.95		$1,214	
	PWFn =	0.5537		PW =	0.5537	X	$43,064	$23,843
YEAR 25								
	LONG SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CNTR LINE JOINT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RNDM / THRM CRACK R&S	50.00%	7,425	LIN FT	$2.00		$14,850	
	PD PVMT PATCH M&F SURF	0.50%	75	SQ YD	$80.95		$6,071	
	PWFn =	0.4776		PW =	0.4776	X	$47,921	$22,887
HMA_SD								
YEAR 30	NON-INTERSTATE							
	MILL PVMT & SHLD 2.00"	100.00%	26,775	SQ YD	$2.75		$73,631	
	PD PVMT PATCH M&F ADD'L 2.00"	2.00%	302	SQ YD	$79.83		$24,109	
	PD SHLD PATCH M&F ADD'L 2.00"	1.00%	117	SQ YD	$79.27		$9,275	
	HMA OVERLAY PVMT 2.25 "	100.00%	15,083	SQ YD	$12.24		$184,646	
	HMA OVERLAY SHLD 2.25 "	100.00%	11,692	SQ YD	$10.71		$125,221	
	PWFn =	0.4120		PW =	0.4120	X	$416,882	$171,750
YEAR 35								
	LONG SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CNTR LINE JOINT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RNDM / THRM CRACK R&S	50.00%	7,425	LIN FT	$2.00		$14,850	
	PD PVMT PATCH M&F SURF	0.10%	15	SQ YD	$80.95		$1,214	
	PWFn =	0.3554		PW =	0.3554	X	$43,064	$15,304
YEAR 40								
	LONG SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CNTR LINE JOINT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RNDM / THRM CRACK R&S	50.00%	7,425	LIN FT	$2.00		$14,850	
	PD PVMT PATCH M&F SURF	0.50%	75	SQ YD	$80.95		$6,071	
	PWFn =	0.3066		PW =	0.3066	X	$47,921	$14,691
								$556,654
	ROUTINE MAINTENANCE ACTIVITY		2.56	Lane Miles	0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$556,654
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$26,638

PCC PAVEMENT

JPCP

ROUTE			FAP 745 (IL 104)	
SECTION			109RS-6, 123RS-3, 123B-2, 124RS-8	
COUNTY			Pike/Morgan	
LOCATION			Meredosia, Segments A, B, C	
FACILITY TYPE			NON-INTERSTATE	
PROJECT LENGTH			4500 FT = = >	0.85 Miles
# OF CENTERLINES			1 CL	
# OF LANES			3 LANES	
# OF EDGES			2 EP	
LANE WIDTH - AVERAGE			12 FT	
SHOULDER WIDTH	PCC	Inside	8 FT	
	PCC	Outside	8 FT	

PAVEMENT THICKNESS (RIGID)	JPCP	9.00 IN	TIED SHLD
SHOULDER THICKNESS		9.00 IN	
POLICY OVERLAY THICKNESS		2.50 IN	

RIGID PAVEMENT TRAFFIC FACTORS		MINIMUM	ACTUAL	USE
		4.59	2.34	4.59
Worksheet Construction Type is	New Construction		The Pavement Type is	JPCP

INITIAL COSTS

ITEM	THICKNESS	100% QUANTITY	UNIT		UNIT PRICE		COST
JPC PAVEMENT	(9.00")	15,083	SQ YD	*	$50.00	/ SQ YD	$754,150
PAVEMENT REINFORCEMENT		0	SQ YD	*		/ SQ YD	$0
STABILIZED SUBBASE	(4.00")	17,275	SQ YD	*	$16.00	/ SQ YD	$276,400
PCC SHOULDERS	(9.00" to 9.00")	11,692	SQ YD	*	$40.00	/ SQ YD	$467,680
CURB & GUTTER		0	LIN FT			/ LIN FT	$0
SUBBASE GRAN MATL TY C	(~ 1.80")	1,298	TONS	*	$32.00	/ TON	$41,536
IMPROVED SUBGRADE:	Aggregate	14,321	SQ YD	*	$12.75	/ SQ YD	$182,593
MODIFIED SOIL		13,185	SQ YD	*	$2.50	/ SQ YD	$32,963
LIME		297	TONS	*	$75.00	/ TONS	$22,250
PAVEMENT REMOVAL		0	SQ YD	*		/ SQ YD	$0
SHOULDER REMOVAL		0	SQ YD	*		/ SQ YD	$0

Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST	$1,777,572
RIGID CONSTRUCTION ANNUAL COST PER MILE	$85,065

MAINTENANCE COSTS:

ITEM	THICKNESS	MATERIAL		UNIT COST	
ROUTINE MAINTENANCE ACTIVITY				$0.00	/ LANE-MILE / YEAR
HMA POLICY OVERLAY	(2.50")				
HMA POLICY OVERLAY PVMT	(2.50")			$13.52	/ SQ YD
HMA SURFACE MIX	(1.50")	Surface Mix		$8.43	/ SQ YD
HMA BINDER MIX	(1.00")	aling Binder Mix		$5.09	/ SQ YD
HMA POLICY OVERLAY SHLD	(2.50")	Shoulder Mix		$11.90	/ SQ YD
CLASS A PAVEMENT PATCHING					/ SQ YD
CLASS B PAVEMENT PATCHING				$220.00	/ SQ YD
CLASS C SHOULDER PATCHING				$135.00	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA Surf)		Surface Mix		$78.15	/ SQ YD
PARTIAL DEPTH PVMT PATCH (Mill & Fill HMA 2.50")		Surface Mix		$83.75	/ SQ YD
LONGITUDINAL SHOULDER JOINT ROUT & SEAL				$2.00	/ LIN FT
CENTERLINE JOINT ROUT & SEAL				$2.00	/ LIN FT
REFLECTIVE TRANSVERSE CRACK ROUT & SEAL				$2.00	/ LIN FT
RANDOM CRACK ROUT & SEAL	(100% Rehab = 100.00' / Station / Lane)			$2.00	/ LIN FT

RIGID TOTAL LIFE-CYCLE COST	$2,142,350
RIGID TOTAL ANNUAL COST PER MILE	$102,521

MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE 11/05/13

JOINTED PLAIN CONCRETE PAVEMENT
UNBONDED JOINTED PLAIN CONCRETE OVERLAY
Figure 54-7.A

MAINTENANCE COSTS:	ITEM	%	QUANTITY	UNIT	UNIT COST		COST	PRESENT WORTH
YEAR 10								
	PAVEMENT PATCH CLASS B	0.10%	15	SQ YD	$220.00		$3,300	
	PWFn =	0.7441		PW =	0.7441	X	$3,300	$2,456
YEAR 15								
	PAVEMENT PATCH CLASS B	0.20%	30	SQ YD	$220.00		$6,600	
	PWFn =	0.6419		PW =	0.6419	X	$6,600	$4,236
YEAR 20								
	PAVEMENT PATCH CLASS B	2.00%	302	SQ YD	$220.00		$66,440	
	SHOULDER PATCH CLASS C	0.50%	58	SQ YD	$135.00		$7,830	
	LONGITUDINAL SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CENTERLINE JT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	PWFn =	0.5537		PW =	0.5537	X	$101,270	$56,071
YEAR 25								
	PAVEMENT PATCH CLASS B	3.00%	452	SQ YD	$220.00		$99,440	
	SHOULDER PATCH CLASS C	1.00%	117	SQ YD	$135.00		$15,795	
	PWFn =	0.4776		PW =	0.4776	X	$115,235	$55,037
YEAR 30	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	4.00%	603	SQ YD	$220.00		$132,660	
	SHOULDER PATCH CLASS C	1.50%	175	SQ YD	$135.00		$23,625	
	HMA POLICY OVERLAY 2.5" (PVMT)	100.00%	15,083	SQ YD	$13.52		$203,859	
	HMA POLICY OVERLAY 2.5" (SHLD)	100.00%	11,692	SQ YD	$11.90		$139,134	
	PWFn =	0.4120		PW =	0.4120	X	$499,278	$205,696
YEAR 35	NON-INTERSTATE							
	LONGITUDINAL SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CENTERLINE JT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	RANDOM CRACK R&S	50.00%	6,750	LIN FT	$2.00		$13,500	
	REFLECTIVE TRANSVERSE CRACK R&S	40.00%	4,320	LIN FT	$2.00		$8,640	
	PD PVMT PATCH M&F HMA 2.50"	0.10%	15	SQ YD	$83.75		$1,256	
	PWFn =	0.3554		PW =	0.3554	X	$50,396	$17,910
YEAR 40	NON-INTERSTATE							
	PAVEMENT PATCH CLASS B	0.50%	75	SQ YD	$220.00		$16,500	
	LONGITUDINAL SHLD JT R&S	100.00%	9,000	LIN FT	$2.00		$18,000	
	CENTERLINE JT R&S	100.00%	4,500	LIN FT	$2.00		$9,000	
	REFLECTIVE TRANSVERSE CRACK R&S	60.00%	6,480	LIN FT	$2.00		$12,960	
	RANDOM CRACK R&S	50.00%	6,750	LIN FT	$2.00		$13,500	
	PD PVMT PATCH M&F HMA 2.50"	0.50%	75	SQ YD	$83.75		$6,281	
	PWFn =	0.3066		PW =	0.3066	X	$76,241	$23,372
								$364,778
	ROUTINE MAINTENANCE ACTIVITY		2.56	Lane Miles	$0.00		$0	$0
					MAINTENANCE LIFE-CYCLE COST			$364,778
45	YEAR LIFE CYCLE	CRFn = 0.0407852			MAINTENANCE ANNUAL COST PER MILE			$17,456

LIFE-CYCLE COST ANALYSIS: NEW DESIGN

Calculated / Revised : **3/12/13 2:22 PM**

			JPCP	HMA
CONSTRUCTION	INITIAL COST	PRESENT WORTH	$1,777,572	$1,534,660
		ANNUAL COST PER MILE	$85,065	$73,441
MAINTENANCE	LIFE-CYCLE COST	PRESENT WORTH	$364,778	$556,654
		ANNUAL COST PER MILE	$17,456	$26,638
TOTAL	LIFE-CYCLE COST	PRESENT WORTH	$2,142,350	$2,091,314
		ANNUAL COST PER MILE	$102,521	$100,079

LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

LOWEST COST OPTION	==========>	**HMA**	**$100,079**	
OTHER OPTIONS (LOWEST TO HIGHEST):	TYPE / PERCENTAGE	**JPCP**	**$102,521**	2.4%

P:\Pavement Design Stuff\D-6\IL 104 from IL 99 to Yeck Road near Meredosia 02-22-13\[72B58--FROM ESTIMATOR--IDOT Mechanistic Pavement Design with LC(